

Issue: Relative Potential Benefit to Water Quality from Forests and Canopy

The intent of this issue is to:

- Identify the areas of greatest need with respect to water quality and quantity, and where forests can have the greatest benefit.

Discussion: Rural forests and urban tree canopy have a tremendous value toward good water quality, aquifer recharge, stormwater mitigation and erosion control. Water is, in fact, one of the biggest issues in the west and is important for fish, wildlife and humans (agriculture, horticulture, industry and for drinking water). Forest canopy shades and cools streams—important for healthy fish habitat. Leaves of trees intercept rainfall, lowering the impact of rain on soil. Roots systems help break up compacted ground while stabilizing soil, leading to greater groundwater recharge, reduced stormwater runoff and associated contaminant loads, and less erosion.

This issue focuses forest management efforts in the areas in greatest need for improved water quality/quantity—in both rural and urban environments.

During the July 14, 2009 Stakeholder meeting, Tom Herron (ID Dept. of Environmental Quality) suggested we also include areas with Total Maximum Daily Load (TMDL) plans. These plans recommend management activities to lower loading of specific pollutants into surface waters. Areas with TMDL's may or may not be listed as impaired.

Data used:

Three data layers informed this issue. These are:

1. **Public Drinking Water**, comprised of:
 - a. Source water delineations from Idaho Department of Environmental Quality's Source Water Protection program. (Note that these data are used with permission and not available for public release)
 - b. Spokane Valley-Rathdrum Prairie (SVRP) Aquifer boundary for the Idaho portion of the aquifer from Idaho Department of Water Resources. Obtained from <http://inside.uidaho.edu>.

The Source Water dataset delineation process “establishes the physical area around a well or surface water intake that will become the focal point of a source water assessment. The process includes mapping the boundaries of the zone of contribution (e.g., the surface and subsurface areas contributing water to the well, or surface water intake) into time of travel zones (e.g., zones indicating the number of years necessary

for a particle of water to reach a well or surface water intake). The size and shape of the source water assessment area depend on the delineation method used, local hydrogeology, and volume of water pumped from the well or surface water intake.” (IDEQ 1999) Additional information on Idaho’s Source Water Assessment Plan and Drinking Water Protection Program can be found at http://www.deq.state.id.us/water/prog_issues/source_water/protection.cfm.

The boundary of the SVRP aquifer was added to the source water delineation to develop a public drinking water layer. This aquifer was added because it is both a sole source for drinking water for more than 500,000 people AND because it has no bedrock cap overlying it. Due to the latter attribute, it is the only designated Sensitive Resource aquifer in Idaho. This means it receives the highest level of protection, as activities over the aquifer can have a direct and relatively quick impact on water quality within the aquifer. Subwatersheds (Hydrologic Unit Code—or HUC—6th level) were flagged if a part of the aquifer or an area of source water delineation was within them. If the watershed was flagged it was classified with a value of 5. If not, it received a value of 0 indicating it does not contain either a part of the aquifer or an area of source water delineation. This was changed for draft two such that any sub-watershed containing a part of the aquifer or an areas of source water delineation was give a value of 1. All others were given a value of 0.

2. Priority Watersheds

Priority watersheds are those containing an impaired stream or lake. Subwatersheds that contain an impaired lake or stream were originally classified with a value of 5. Subwatersheds that did not contain an impaired stream or lake are classified with a value of 0. This was changed for draft two such that any sub-watershed in which there is an impaired stream or lake was given a value of one. Those which did not were given a value of 0.

Source data is the 303(d) list of all impaired waters in the state, per Section 303(d) of the Clean Water Act. These data are part of the 2008 303d/305b Integrated Report, collected and maintained by the Idaho Department of Environmental Quality, and are available for download on-line at:

http://data.insideidaho.org/data/IDEQ/archive/streams305b2008_id_ideq.zip
http://data.insideidaho.org/util/zip.ashx?fn=http://data.insideidaho.org/data/IDEQ/downdata/lakes305b2008_id_ideq.zip

3. Impervious Surfaces

Impervious surfaces came from the National Land Cover Database (NLCD) 2001 imperviousness layer, produced through a cooperative project conducted by the Multi-Resolution Land Characteristics (MRLC) Consortium, a partnership of federal agencies

(www.mrlc.gov). For a detailed definition and discussion on MRLC and the NLCD 2001 products, refer to <http://www.mrlc.gov/mrlc2k.asp>.

The NLCD_2001_impervious layer was used where the percent of imperviousness of a 30 meter cell was converted to the impervious area and summed to a 6th order HUC. Any HUC that had 2% or greater impervious surfaces was counted and given a value of 1. All others received a value of 0.

4. Areas with total Maximum Daily Load (TMDL) Plans

Areas with TMDL's were derived from the 2008 303(d)-305(b) integrated water quality report by the Idaho Department of Environmental Quality. All sub-watersheds in which a TMDL plan was located received a value of 1, all others were given a value of 0.

Issue Process—Draft Two (Current): All four datasets were added together giving a range of scores of 0 through 4. The zero was dropped and the other scores were reclassified with scores of 2 – 5.

Issue Process—Draft One (Old): The resulting water quality layer was given a weight of 3 if it was either a priority watershed or a public drinking water watershed. A weight of 4 was given if a watershed was both a priority watershed and a public drinking water watershed. The impervious layer added 1 to the weighting where the impervious was greater than 18% (determined by looking at the natural breaks in the data). This gave the final water quality weighting values of 0, 3, 4, or 5.

Data Considered, but not used:

The following datasets were also considered, but not used:

- Water temperature: temperature data is one of the attributes that may contribute to a lake or stream being classified as 303(d), so is already included.
- Well Locations/permits and the areas they draw from: There are more than 170,000 well permits within Idaho—most are for single dwellings, but other uses include industry, commercial, irrigation (agriculture), fire protection, heating, public water supply and more. The core team was uncertain how best to utilize this information to inform the water quality/quantity issue, especially since well data is point information (no draw areas were available) and so many existed. We felt the most critical water use for which forestry practices can have a significant impact is municipal/public drinking water. The core team decided using municipal water source data, which includes both below and above ground water sources via the Source Water Assessment Program, would better inform this issue.

- Major deep-water aquifers: Including these aquifers would result in a lot of area. There are three aquifers in Idaho designated as sole sources for drinking water—Rathdrum Prairie, Lewiston Basin and Eastern Snake River Basin aquifers. We considered including these, but two of the three have a bedrock cap (activities over the aquifer do not necessarily directly impact water quality or quantity within the aquifers unless pumping from or injecting into them). Areas over these aquifers from which municipal or public water supplies are drawn are already included within the source water data. As noted above, the Rathdrum Prairie Aquifer was included due to its designation as a Sensitive Resource aquifer, which affords it the highest level of protection. For this reason, this aquifer was included while the others were not.
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IDEQ (Idaho Division of Environmental Quality) Ground Water Program, Idaho Source Water Assessment Plan, 1999, Boise, ID 200 p.

http://www.deq.state.id.us/water/data_reports/source_water/swa_plan_1999.pdf

IDEQ Surface Water: Integrated §303(d)/§305(b) Report

http://www.deq.state.id.us/WATER/data_reports/surface_water/monitoring/integrated_report.t.cfm